

Ecological Benefits Assessment Strategic Plan

Appendix B

Literature and Information Resources for Ecological Benefits Assessment

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Prepared for

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1. INTRODUCTION

The purpose of this document is to support both the development and the implementation of EPA's Ecological Benefits Assessment Strategic Plan. The goal of this Strategic Plan is to advance EPA's ability to identify, measure, value, and communicate the ecological benefits of its actions, in order to improve the integrity of EPA decision-making.

This document lists, describes, and provides Web links to a wide variety information resources that address topics related to the measurement, modeling, and economic valuation of ecosystem effects (including ecological goods and services). These resources were identified through extensive web and library searches and through a series of meetings in 2002 and 2003 with EPA staff and with economists and ecologists from other federal government agencies.

It is beyond the scope of this project to provide a detailed and itemized review all of the potentially relevant research in this multidisciplinary field. Instead, this document provides an overview of the research landscape for ecological benefits assessment. It identifies publications, reports, and other information resources from a broad range of sources that (1) summarize and discuss the key issues related to integrating ecological and economic assessment methods and/or (2) provide lists, descriptions, and links to summaries of applied research activities in these areas. By providing this overview and access to resources, this document will assist in highlighting key research gaps, identifying priority areas for initiating or extending research activities, and developing strategies for improving communication between ecologists and economists.

Sections 2 and 3 of this document provide bibliographic references to key publications (from both peer-reviewed sources and the "grey" literature) addressing issues related ecological risk assessment, ecosystem valuation, and the integration of these approaches for benefits assessment. Section 4 provides a list of online databases and bibliographies that contain more comprehensive and targeted lists of references, data, and project descriptions. Section 5 contains EPA sources, including reports, workshop summaries, and links to papers and project abstracts. These sources provide an overview of the range and types of ecological benefits assessment activities being conducted at the Agency. Section 6 describes similar types of sources for other federal agencies, including the U.S. Army Corps of Engineers (ACE), the National Oceanic and Atmospheric Administration (NOAA), and various agencies within the Department of Interior (DOI). Sections 7 and 8 include descriptions and links to foreign government sources and to nongovernmental agencies, respectively.

2. BOOKS

The following is a list of published books that address the major issues related ecological risk assessment, ecosystem valuation, and the integration of those approaches for benefits assessment:

- Abelson, P.W. 1996. *Project Appraisal and Valuation of the Environment*. New York, NY: St. Martin's Press.
- Anderson, M. and R. Magleby. 1997. *Agricultural Resources and Environmental Indicators, 1996-97*. Washington, DC: USDA Economic Research Service Agricultural Handbook No. 712.
- Barbier, E.B., M.C. Acreman, and D. Knowler. 1996. *Economic Valuation of Wetlands: A Guide for Policy Makers and Planners*. Gland, Switzerland: Ramsar Convention Bureau.
- Barbier, E.B., J.C. Burgess, and C. Folke. 1994. *Paradise Lost? The Ecological Economics of Biodiversity*. London: Earthscan.
- Butterwirth, F.M., M.E. Gosenbatt, and A. Gunatilaka (eds.). 2000. *Biomonitoring and Biomarkers as Indicators of Environmental Change Handbook (Environmental Science Research Volume 56)*. New York, NY: Plenum Publishing Corporation.
- Cleveland, C.J., D.I. Stern, and R. Costanza (eds.). 2001. *The Economics of Nature and the Nature of Economics*. Advances in Ecological Economics Series. Cheltenham, UK: Edward Elgar Publishing.
- Cordell, H.K., and J.C. Bergstrom (eds.). 1999. *Integrating Social Sciences with Ecosystem Management: Human Dimensions in Assessment, Policy and Management*. Champaign, IL: Sagamore Publishing.
- Costanza, R. (ed.). 1991. *Ecological Economics: The Science and Management of Sustainability*. New York, NY: Columbia University Press.
- Costanza, R., B.S. Low, E. Ostrom, and J. Wilson (eds.). 2001. *Institutions, Ecosystems, and Sustainability*. Boca Raton, FL: Lewis Publishers.
- Costanza, R., J. Cumberland, H. Daly, R. Goodland, and R. Norgaard. 1997. *An Introduction to Ecological Economics*. ISEE (International Society for Ecological Economics). Boca Raton, FL: St. Lucie Press.
- Costanza, R., O. Segura, and J. Martinez-Alier (eds.). 1996. *Getting Down to Earth: Practical Applications of Ecological Economics*. Washington DC: Island Press.
- Daily, G.C. (ed.). 1997. *Nature's Services: Societal Dependence on Natural Ecosystems*. Washington, DC: Island Press.

- Ferenc, S.C., and J.A. Foran (eds.). 1999. *Multiple Stressors in Ecological Risk and Impact Assessments: Approaches to Risk Estimation* (SETAC Special Publications Series). Pensacola, FL: Society of Environmental Toxicology and Chemistry.
- Gosselink, J.A., T. Muir, and L.C. Lee (eds.). 1990. *Ecological Processes and Cumulative Impacts Illustrated by Bottomland Hardwood Wetland Ecosystems*. Chelsea, MI: Lewis Publishers, Inc.
- Hausman, J.A. (ed.). 1993. *Contingent Valuation: A Critical Assessment*. Amsterdam: Elsevier Science Publishers.
- Irwin, F., and B. Rodes (eds.). 1991. *Making Decisions on Cumulative Impacts: A Conceptual Framework*. Washington, DC: World Wildlife Fund.
- Jansson, A.-M., M. Hammer, C. Folke, and R. Costanza (eds.). 1994. *Investing in Natural Capital: The Ecological Economics Approach to Sustainability*. Washington, DC: Island Press.
- Kaiser, J., J.E. Klanning, and L.E. Erickson. 2001. *Bioindicators and Biomarkers of Environmental Pollution and Risk Assessment*. Plymouth, UK: Science Publishers, Inc.
- Kopp, R.J., and V.K. Smith. 1993. *Valuing Natural Assets: The Economics of Natural Resource Damage Assessment*. Washington, DC: Resources for the Future.
- Lawn, P.A. 2001. *Toward Sustainable Development: An Ecological Economics Approach*. ISEE (International Society for Ecological Economics). Boca Raton, FL: Lewis Publishers.
- Manno, J.P. 2000. *Privileged Goods: Commoditization and Its Impact on Environment and Society*. Boca Raton, FL: Lewis Publishers.
- Morgenstern, R.D. (ed.). 1997. *Economic Analyses at EPA. Assessing Regulatory Impact*. Washington, DC: Resources for the Future.
- Munasinghe, M., O. Sunkel, and C. de Miguel (eds.). 2001. *The Sustainability of Long-term Growth: Socioeconomic and Ecological Perspectives*. Advances in Ecological Economics Series. Cheltenham, UK: Edward Elgar Publishing.
- Pearce, D., and D. Moran. 1994. *The Economic Value of Biodiversity*. London, UK: Earthscan Publication.
- Perrings, C, K.-G. Maler, C. Folke, C.S. Holling, and B.-O. Jansson (eds.). 1995. *Biodiversity Loss: Economic and Ecological Issues*. New York, NY: Cambridge University Press.
- Prugh, T. 1999. *Natural Capital and Human Economic Survival*. Boca Raton, FL: Lewis Publishers.

Rosenberg, D.M., and V.H. Resh (eds.). 1993. *Freshwater Biomonitoring and Benthic Macroinvertebrates*. New York, NY: Chapman and Hall.

Simpson, R.D., and N.L. Christensen, Jr. 1997. *Ecosystem Function and Human Activities: Reconciling Economics and Ecology*. New York, NY: Chapman & Hall.

3. JOURNAL ARTICLES, PRESENTATIONS, BOOK CHAPTERS, AND WORKING PAPERS

The following is a list of shorter publications, both peer-reviewed and in the grey literature, that address the major issues related to ecological risk assessment, ecosystem valuation, and the integration of those approaches for benefits assessment:

Ecosystems. 2000. 3(1). Special Issue on Valuation of Ecosystems

This special issue of *Ecosystems* contains eight short articles from leading economists and ecologists. These articles (listed below) provide overviews and assessments of practices related to ecosystem valuation.

1. S. Carpenter and M. Turner. "Opening the Black Boxes: Ecosystem Science and Economic Valuation."
2. R. Costanza. "Social Goals and the Valuation of Ecosystem Services."
3. J. Chavas. "Ecosystem Valuation under Uncertainty and Irreversibility."
4. D. Starrett. "Shadow Pricing in Economics."
5. H. Odum and E. Odum. "The Energetic Basis for Valuation of Ecosystem Services."
6. G. Heal. "Valuing Ecosystem Services."
7. D. Ludwig. "Limitations of Economic Valuation of Ecosystems."
8. L. Pritchard Jr., C. Folke, and L. Gunderson. "Valuation of Ecosystem Services in Institutional Context."

Adamowicz, W., J. Louviere, and M. Williams. 1994. "Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities." *Journal of Environmental Economics and Management* 26:271-292.

Arrow, K., G. Daily, P. Dasgupta, S. Levin, K. Maler, E. Maskin, D. Starrett, T. Sterner, and T. Tietenberg. 2000. "Managing Ecosystem Resources." *Environmental Science and Technology* 34:1401-1406.

Bingham, G., R. Bishop, M. Brody, D. Bromley, E. Clark, W. Cooper, R. Costanza, T. Hale, G. Hayden, S. Kellert, R. Norgard, B. Norton, J. Payne, C. Russell, and G. Suter. 1995. "Issues in Ecosystem Valuation: Improving Information for Decision Making." *Ecological Economics* 14:73-90.

Bockstael, N., M. Freeman, R. Kopp, P. Portney, and K. Smith. 2000. "On Measuring the Economic Values for Nature." *Environmental Science and Technology* 34:1384-1389.

Bockstael, N., R. Costanza, I. Strand, W. Boynton, K. Bell, and Wainger. 1995. "Ecological Economic Modeling and Valuation of Ecosystems." *Ecological Economics* 14:143-159.

- Bowles, S. 1998. "Endogenous Preferences: The Cultural Consequences of Markets and Other Economic Institutions." *Journal of Economic Literature* 36:75–111.
- Christensen, N.L., Bartuska, A.M., Brown, I.H., Carpenter, S., D'Antonio, C., Francis, R., Franklin, J.F., MacMahon, J.A., Noss, R.F., Parsons, D.I., Peterson, C.H., Turner, M.G., and Woodmansee, R.G. 1996. *Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. Ecological Applications*, 6(3):665–691.
- Contant, C.K., and L.L. Wiggins. 1989. "Toward Defining and Assessing Cumulative Impacts: Practical and Theoretical Considerations." In *The Scientific Challenges of NEPA: Future Directions*, S.G. Hildebrand and J. B. Cannon (eds.), pp. 336-355. Ninth Oak Ridge National Laboratory Life Sciences Symposium, Knoxville, Tennessee, October 24-27, 1989. Ann Arbor, MI: Lewis Publishers.
- Cork, S., D. Shelton, C. Binning, and R. Parry. 2001. "A Framework for Applying the Concept of Ecosystem Services to Natural Resource Management in Australia." In *Third Australian Stream Management Conference*, Ruthorford, I., F. Sheldon, G. Brierly, and C. Kenyon (eds.), pp. 157-162. August 27-29, 2001. Brisbane: Cooperative Research Center for Catchment Hydrology.
- Costanza, R., R. d'Arge, R. de Groot, S. Farber; M. Grassot; B. Hannon; K. Limburg, S. Naeem, R.V. O'Neill, J Paruelo, R.G. Raskin, P. Sutton, and M. van den Belt. 1997. "The Value of the World's Ecosystem Services and Natural Capital." *Nature* 387:253-280.
- Daily, G.C., S. Alexander, P.R. Ehrlich, L. Goulder, J. Lubchenco, P.A. Matson, H.A. Mooney, S. Postel, S.H. Schneider, D. Tilman, and G.M. Woodwell. 1997. "Ecosystem Services: Benefits Supplied to Human Societies by Natural Ecosystems." *Issues in Ecology* 2:1-16.
- Desvousges, W.H., H. Gable, R. Dunford, and R. Hudson. 1993. "Contingent Valuation: The Wrong Tool to Measure Passive-use Losses." *Choices* 8(2):9-11.
- Garrod, G.D., and K.G. Willis. 1994. "Valuing Biodiversity and Nature Conservation at a Local Level." *Biodiversity and Conservation* 3:555-565.
- Gowdy, J. 1997. "The Value of Biodiversity." *Land Economics* 73(1):25-71.
- Gregory, M.B., and E.A. Frick. 2001. "Indicator-bacteria Concentrations in Streams of the Chattahoochee River National Recreation Area, March 1999- April 2000." In *Proceedings of the 2001 Georgia Water Resources Conference*, K.J. Hatcher (ed.). March 26-27, 2001. University of Georgia.
http://ga.water.usgs.gov/nawqa/IndicatorBacteria_99_00_final.pdf
- Kantrud H.A., and W.E. Newton. 1996. "A Test of Vegetation-related Indicators of Wetland Quality in the Prairie Pothole Region." *Journal of Aquatic Ecosystem Health Management* 5:177-191.
<http://www.npwr.usgs.gov/resource/othrdata/vegindic/vegindic.htm>

- Loomis, J.B., and D.S. White. 1996. "Economic Benefits of Rare and Endangered Species: Summary and Meta-analysis." *Ecological Economics* 18(18):197-206.
- Michael, H.J., K.J. Boyle, and R. Bouchard. 2000. "Does the Measurement of Environmental Quality Affect Implicit Prices Estimated from Hedonic Models?" *Land Economics* 76(2):283-298.
- Moran, D., and D. Pearce. 1997. "The Economics of Biodiversity." In *The International Yearbook of Environmental and Resource Economics 1997/1998—A Survey of Current Issues*, Henk Folmer and Tom Tietenberg (eds.), pp. 82-113, Cheltenham, UK: Edward Elgar Publishing Company.
- Pearce, D. 1998. "Auditing the Earth" (review of "The Value of the World's Ecosystem Services and Natural Capital"). *Environment* 40(2):23-28.
- Pimentel, D. 1988. "Economic Benefits of Natural Biota." *Ecological Economics* 25(1):45-47.
- Pimentel, D., C. Wilson, C. McCullum, R. Huang, P. Dwen, J. Flack, Q. Tran, T. Saltman, and B. Cliff. 1997. "Economic and Environmental Benefits of Biodiversity." *Bioscience* 47(11):747-757.
- Principe, P. 1995. "Ecological Benefits Assessment: A Policy-oriented Alternative to Regional Ecological Risk Assessment." *Human and Ecological Risk Assessment* 1(4):423-435.
- Renner, R. 1998. "Calculating the Cost of Natural Resource Damage." *Environmental Science and Technology* (Feb 1):86-90.
- Schaberg, R., T. Holmes, K. Lee, and R. Abt. 1999. "Ascribing Value to Ecological Processes: An Economic View of Environmental Change." *Forest Ecology and Management* 114:329-338.
- Shogren, J.F., and C. Nowell. 1992. "Economics and Ecology: A Comparison of Experimental Methodologies and Philosophies." *Ecological Economics* 5:101-126.
- Schweiger, E., S. Leibowitz, J. Hynam, W. Foster, and M. Downing. 2002. "Synoptic Assessment of Wetland Function: A Planning Tool for Protection of Wetland Species Biodiversity." *Biodiversity and Conservation* 11:379-406.
- Smith, V.K. 1997. "Pricing What is Priceless: A Status Report on Non-Market Valuation of Environmental Resources." In *The International Yearbook of Environmental and Resource Economics 1997/1998*, H. Folmer and T. Tietenberg (eds.), pp. 156-204, Cheltenham, UK: Edward Elgar Publishing Company.
- Toman, M.A. 1998. "Why Not Calculate the Value of the World's Ecosystem Services and Natural Capital?" *Ecological Economics* 25:57-60.
- Unsworth, R., and R. Bishop. 1994. "Assessing Natural Resource Damages Using Environmental Annuities." *Ecological Economics* 11:35-41.

Wilson, M.A., and S.R. Carpenter. 1999. "Economic Valuation of Freshwater Ecosystem Services in the United States: 1971-1997." *Ecological Applications* 9:772-783.

4. DATABASES/BIBLIOGRAPHIES

The following is a list of online databases and bibliographies that contain detailed and targeted lists of references, data, and project descriptions related to ecosystem valuation, ecological risk assessment, and ecological benefits assessment.

The Beneficial Use Values Database.

UC-Davis' Agricultural and Resource Economics Department.

<http://buvd.ucdavis.edu/index.htm>

The Biodiversity Bibliography.

University of Minnesota.

- Includes bibliographies for ecosystem valuation, bioeconomic modeling, and valuation methods

<http://www.apec.umn.edu/faculty/spolasky/Biobib.html>

Coral Reef Literature Review.

NOAA Coastal and Ocean Resource Economics.

<http://www3.nos.noaa.gov/forms/econ/corebibs/coralsearch.lasso>

Coral Reef Valuation Database.

NOAA Marine Economics.

<http://www.marineeconomics.noaa.gov/Reefs/Master.zip>

Cumulative Environmental Effects Cross-Referenced Annotated Bibliography.

Canadian Environmental Assessment Agency.

http://www.ceaa-acee.gc.ca/0012/0005/0001/biblio_e.htm

Ecosystem Valuation.

- Provides overview, discussion, references, and links to other sites related to ecosystem valuation.

<http://www.ecosystemvaluation.org/>

ENVALUE Environmental Valuation Database.

New South Wales, Australia EPA.

<http://www2.epa.nsw.gov.au/envalue/>

The Environmental Valuation Reference Inventory (EVRI).

Environment Canada.

<http://199.212.18.90/evri/>

Florida Environmental Resource Valuation Case Studies.

NOAA Marine Economics.

http://www.marineeconomics.noaa.gov/bibsb/ANNOBIB4_FIN.pdf

- The National Biological Information Infrastructure (NBII).*
U.S. Geological Survey Center for Biological Informatics.
<http://www.nbii.gov/index.html>
- Non-Market Values Database for the National Ocean Economics Project.*
USC Wrigley Institute for Environmental Studies.
<http://biology.usc.edu/NOEP/>
- Recent Literature on Contingent Valuation Methods for Valuing Environmental Goods.*
T. Cameron, UCLA.
• List of studies with abstracts
<http://www.sscnet.ucla.edu/ssc/labs/cameron/nrs98/cvinv.htm>
- Recreation Values Database.*
R. Rosenberger, University of West Virginia, under contract to the U.S. Forest Service.
http://www.marineconomics.noaa.gov/bibsb/Rec_Values_Data_1998.xls
- South Florida Ecological Bibliography.*
NOAA Coastal and Ocean Resource Economics.
<http://www3.nos.noaa.gov/forms/econ/corebibs/ecosearch.lasso>
- South Florida Socioeconomic Bibliography.*
NOAA Coastal and Ocean Resource Economics.
<http://www3.nos.noaa.gov/forms/econ/corebibs/socsearch.lasso>
- Sportfishing Values Database.*
Industrial Economics, Inc.
<http://www.indecon.com/infoprod.htm>
- Valuing the Nature of Maine Database.*
Maine Audubon Society.
<http://www.maineaudubon.org/bib/val.html>

5. USEPA REPORTS AND RESOURCES

The following is a list of EPA sources, including reports, workshop summaries, and links to papers and project abstracts. These sources provide an overview of the range and types of ecological benefits assessment activities being conducted at the Agency. They are organized by office (or program) and listed alphabetically by title.

5.1 General EPA

EPA "Ecosystems" Website

<http://www.epa.gov/ebtpages/ecosystems.html>

5.2 Office of Air and Radiation (OAR)

The Benefits and Costs of the Clean Air Act, 1970 to 1990. 1997. Office of Air and Radiation
EPA 410-R-97-002.

<http://www.epa.gov/air/sect812/contsetc.pdf>

The Benefits and Costs of the Clean Air Act, 1990 to 2010. 1997. Office of Air and Radiation
EPA 410-R-99-001

<http://www.epa.gov/air/sect812/1990-2010/fullrept.pdf>

5.3 Office of Pesticide Programs (OPP)

Initiative to Revise the Ecological Assessment Process for Pesticides

<http://www.epa.gov/oppefed1/ecorisk/index.htm>

5.4 Office of Policy Economics and Innovation (OPEI)

Ecosystem Services and Their Valuation.

Prepared by RCG/Hagler, Bailly, Inc., for EPA, Office of Policy Analysis. February
1990. Draft Final Report.

Guidelines for Preparing Economic Analyses.

EPA Office of the Administrator. September 2000. EPA 240-R-00-003.

*National Center for Environmental Economics (NCEE), Environmental Economics Reports
Inventory.*

<http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/EnvironmentalEconomicsReports.html>

Benefit Methodologies Applied to Ecological Hazards from Toxic Substances, Volume II of Research and Demonstration of Improved Methods for Carrying Out Benefit-Cost Analysis of Individual Regulation.

<http://yosemite.epa.gov/EE/epa/eerm.nsf/vwRepNumLookup/EE-0269B?OpenDocument>

Economic Valuation of Aquatic Ecosystems.

<http://yosemite.epa.gov/EE/epa/eerm.nsf/vwRepNumLookup/EE-0237?OpenDocument>

Integrating the Environment and the Economy: Proceedings of June 1994 Association of Environmental and Resource Economists Workshop.

<http://yosemite.epa.gov/EE/epa/eerm.nsf/vwRepNumLookup/EE-0126?OpenDocument>

Inventory of Ecosystem Effects.

<http://yosemite.epa.gov/EE/epa/eerm.nsf/vwRepNumLookup/EE-0364?OpenDocument>

Marine Pollution and Environmental Damage Assessment.

<http://yosemite.epa.gov/EE/epa/eerm.nsf/vwRepNumLookup/EE-0121?OpenDocument>

Proceedings of the Colloquium on Economics, Ecology, and Sustainable Policies.

<http://yosemite.epa.gov/EE/epa/eerm.nsf/vwRepNumLookup/EE-0153?OpenDocument>

Valuing and Managing Ecosystems: Economic Research Sponsored by NSF/EPA, Proceedings of the first Workshop in the Environmental Policy and Economics Workshop Series.

<http://yosemite.epa.gov/EE/epa/eerm.nsf/vwRepNumLookup/EE-0409?OpenDocument>

5.5 Office of Research and Development (ORD)

EPA Science Forum 2003: Partnering to Protect Human Health and the Environment
May 5-7, 2003, Washington, DC

Moving Science into Action Poster Abstracts:

http://www.epa.gov/ord/scienceforum/abstracts_science.htm

Year of Water Poster Abstracts:

http://www.epa.gov/ord/scienceforum/abstracts_water.htm

Integrating Ecological Risk Assessment and Economic Analysis in Watersheds.

Bruins, R.J.F, M.T. Heberling, O.H. Erikson, R.J. Supalia, S. Stewart, and J. Kahn.
2002. Poster presented by NCEA to The Society of Environmental Toxicology and Chemistry.

Managing Ecological Risks at EPA: Issues and Recommendations for Progress.

Troyer, M., and M. Brody. September 1994. Office of Research and Development and Office of Policy, Planning and Evaluation. EPA/600/R-94/183.

National Center for Environmental Assessment (NCEA)

<http://cfpub.epa.gov/ncea/>

Ecological Risk Assessment Program.

<http://cfpub.epa.gov/ncea/cfm/ecologic.cfm>

Framework on Cumulative Risk Assessment

<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=54944>

Generic Assessment Endpoints for Ecological Risk Assessments. Risk Assessment Forum. October 2002. External Review Draft.

<http://cfpub.epa.gov/ncea/raf/recordisplay.cfm?deid=54923>

NCEA Science Inventory

<http://cfpub.epa.gov/ncea/cfm/sciencequery.cfm?ActType=Project&detype=project&collect=science+invent&excCol=archive>

Key projects in the NCEA Science Inventory include:

Advancing Ecological Risk Assessment Through Guidance for Planning Assessments and Developing Assessment Endpoints.

<http://cfpub.epa.gov/ncea/cfm/sciencedisplay.cfm?deid=22515&ActType=project>

Cultural Models of Environmental Risk Perception.

<http://cfpub.epa.gov/ncea/cfm/sciencedisplay.cfm?deid=22496&ActType=project>

Framework for Cumulative Risk Assessment.

<http://cfpub.epa.gov/ncea/cfm/sciencedisplay.cfm?deid=22457&ActType=project>

Harmonization of Human and Ecological Health Assessment: Development of Bayesian Updating Techniques to Incorporate Mechanistic Information Across Species.

<http://cfpub.epa.gov/ncea/cfm/sciencedisplay.cfm?deid=22452&ActType=project>

Integrated Assessment for a Sustainable Bering Sea.

<http://cfpub.epa.gov/ncea/cfm/sciencedisplay.cfm?deid=22446&ActType=project>

Risk Assessment for Benefits Analysis.

<http://cfpub.epa.gov/ncea/cfm/sciencedisplay.cfm?deid=56433&ActType=project>

National Center for Environmental Research (NCER) STAR Grants

Project Abstracts

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/research.search/rpt/abs/type/3

Links to Project Abstracts by Selected Research Categories¹:

Approaches to Multi-scale Ecological Assessment in the Middle Atlantic Region.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/568

Computing Technology for Ecosystem Modeling.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/367

Decision Making and Valuation for Environmental Policy.
http://cfpub2.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/566

Development of National Aquatic Ecosystem Classifications and Reference Conditions.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/research.display/rpt/abs/rfa_id/130

Development of Watershed Classification Systems for Diagnosis of Biological Impairment in Watersheds.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/829

Ecological Indicators.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/109

Ecosystem Indicators.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/4

Ecosystem Restoration.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/16

Endocrine Disruptors.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/2

Environmental Biology.
http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/3

¹ Links to these and other research categories can also be found by selecting specific project abstracts (see “Project Abstracts” link above) and then clicking on the “Research Category” field.

Environmental Statistics.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/15

Exploratory Research—Environmental Biology.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/343

Harmful Algal Blooms.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/38

Nutrient Science for Improved Watershed Management.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/830

Recreational Water Quality.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/132

Regional Scale Analysis and Assessment.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/58

Research Program on Statistical Survey Design and Analysis for Aquatic Resources.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/143

Terrestrial Ecology and Global Change.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/34

Understanding the Sources and Fate of Conventional and Alternative Indicator Organisms in Tropical Waters.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/1008/report/0

Water and Watersheds.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/22

Wildlife Risk Assessment.

http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.researchCategory/rc_id/565

Office of Research and Development Strategic Plan.

January 2001. EPA/600/R-01/003.

<http://www.epa.gov/osp/stplan.htm>

ORD's Work on Invasive Species

<http://www.epa.gov/ord/htm/article2.htm>

Priorities for Ecological Protection: An Initial List and Discussion Document for EPA.

Office of Research and Development. January 1997. EPA/600/S-97/002.

<http://www.epa.gov/ORD/WebPubs/priorities/priorit.pdf>

Research Plan for Integrating Ecological Risk Assessment and Economics in Place-Based Decision Making.

EPA National Center for Environmental Assessment. 2000. NCEA-C-0633.

Willamete Basin Alternative Futures Analysis.

Office of Research and Development. August 2002. EPA 600/R-02/045(a).

http://www.fsl.orst.edu/pnwerc/wrb/proj_summary.pdf

5.6 Office of Science Policy (OSP)

Critical Ecosystems Workshop.

June 2002. Keystone, CO.

<http://www.epa.gov/osp/regions/criteco.htm>

A Framework for the Economic Assessment of Ecological Benefits.

EPA Social Sciences Discussion Workgroup. February 2002.

<http://epa.gov/osp/spc/feab3.pdf>

5.7 Office of Sustainable Ecosystems and Communities (OSEC)

Targeting Regional Priority Places. Ecosystem Targeting: Criteria, Methods, and Data Sources.

Prepared by ICF Incorporated for EPA, Office of Sustainable Ecosystems and Communities. December 1998.

5.8 Office of Water (OW)

Assessing the Neglected Ecological Benefits of Watershed Management Practices, A Resource Book.

Prepared by ICF Consulting for EPA, Office of Water. April 2000.

Biological Indicators of Watershed Health.

<http://www.epa.gov/bioindicators/>

EPA AQUATOX Model.

- Simulates the fate and effects of multiple environmental stressors on freshwater ecosystems.

<http://www.epa.gov/waterscience/models/aquatox/about.html>

National Coastal Condition Report.

Office of Research and Development/Office of Water. September 2001. EPA-620/R-01/005.

<http://epa.gov/owow/oceans/nccr/downloads.html>

Standardizing the Framework for Valuing Ecosystem Services.

Office of Water. October 2002. Working Paper.

5.9 EPA Regional Offices

Ecosystems Protection & Remediation Office.

EPA Region 8.

<http://www.epa.gov/region08/about/orgchart/epr.html>

Mid-Atlantic Environmental Services Division.

EPA Region 3.

<http://www.epa.gov/reg3esd1/>

New England Biological Assessment of Wetlands Work Group.

EPA Region 1.

<http://www.epa.gov/region1/eco/wetland/index.html>

Northwest Biological Assessment Workgroup.

EPA Region 10.

<http://yosemite.epa.gov/R10/OEA.NSF/af6d4571f3e2b1698825650f0071180a/0cb4cd7af3495b4c88256bdc007b7c55?OpenDocument>

Science and Ecosystem Support Division.

EPA Region 4.

<http://www.epa.gov/region4/sesd/>

Southeastern Ecological Framework.

EPA Region 4.

<http://www.geoplan.ufl.edu/epa/index.html>

5.10 Environmental Monitoring and Assessment Program (EMAP)

EMAP Research Strategy.

http://www.epa.gov/emap/html/pubs/docs/resdocs/EMAP_Research_Strategy.pdf

5.11 Science Advisory Board (SAB)

A Framework for Assessing and Reporting on Ecological Condition: A Summary.

EPA Science Advisory Board. September 2002. EPA-SAB-EPEC-02-009A

<http://www.epa.gov/sab/pdf/epec02009a.pdf>

Panel on Valuing the Protection of Ecological Systems and Services.

EPA Science Advisory Board.

<http://www.epa.gov/sab/panels/vpesspanel.html>

Review of the Draft Analytical Plan for EPA's Second Prospective Analysis—Benefits and Costs of the Clean Air Act 1990-2020.

EPA Advisory Council on Clean Air Compliance Analysis. September 2001. Chapter 5 and Appendices D and E.

<http://www.epa.gov/science1/pdf/councila01004.pdf>

Toward Integrated Environmental Decision-Making.

EPA Science Advisory Board. August 2000. EPA-SAB-EC-00-011

<http://www.epa.gov/sab/pdf/ecirp011.pdf>

Understanding Public Values and Attitudes Related to Ecological Risk Management: An SAB Workshop Report of an EPA/SAB Workshop. September 2001.

EPA-SAB-EC-WKSP-01-001

<http://www.epa.gov/science1/pdf/ecwksp01001.pdf>

6. OTHER U.S. GOVERNMENT SOURCES

The following is a list of non-EPA federal government sources, including reports, workshop summaries, and links to papers and project abstracts. These sources provide an overview of the range and types of ecological benefits assessment activities being conducted by other federal agencies. They are organized by agency and listed alphabetically by title.

6.1 Army Corps of Engineers

Des Plaines River Phase I Project.

<http://www.lrc.usace.army.mil/projects/desplr-r-ped.htm>

Economic and Environmental Analysis Conference: "Balancing Economy and Environment."
New Orleans, LA, July 16-18, 2002.

<http://www.usace.army.mil/inet/functions/cw/cecwp/eande2002>

6.1.1 Institute for Water Resources (IWR)

Draft Report on Improving Environmental Benefits Analysis. January 2003. Alexandria, VA:
USACE, IWR.

Environmental Activities in Corps of Engineers Water Resources Programs. Charting a New Direction. 1993.

<http://www.iwr.usace.army.mil/iwr/pdf/93PS-1new.pdf>.

The Evaluation of Environmental Investments Research Program.

Managed jointly with the USACE's Waterways Experiment Station.

<http://www.wes.army.mil/el/ecubed/eeirp.html>

Improvements for EBA (Environmental Benefits Analysis).

March 2001. White Paper.

<http://www.iwr.usace.army.mil/iwr/pdf/stakhivnrc.pdf>

IWR Reports Inventory

<http://www.iwr.usace.army.mil/iwr/products/reports/reports.htm>

Evaluation of Environmental Investments Procedures Overview Manual.

<http://www.iwr.usace.army.mil/iwr/pdf/96r30.pdf>

Incorporating Significance: A New Perspective for Environmental Project Planning.

<http://www.iwr.usace.army.mil/iwr/pdf/95r10.pdf>

Monetary Measurement of Environmental Goods and Services: Framework and Summary of Techniques for Corps Planners.

<http://www.iwr.usace.army.mil/iwr/pdf/96r24.pdf>

Resource Monetary and Nonmonetary Valuation of Environmental Investments.
<http://www.iwr.usace.army.mil/iwr/pdf/95r02.pdf>

Review of Compilation and Review of Completed Restoration and Mitigation Studies in
Developing an Evaluation Framework for Environmental Resources Volume II.
<http://www.iwr.usace.army.mil/iwr/pdf/95r05.pdf>

Risk and Uncertainty into Environmental Evaluation: An Annotated Bibliography.
<http://www.iwr.usace.army.mil/iwr/pdf/96r09.pdf>

Valuing Urban Wetlands: A Property Pricing Approach.
<http://www.iwr.usace.army.mil/iwr/pdf/97r01.pdf>

6.1.2 Engineer Research and Development Center

Amenity Resource Valuation: Integrating Economics with Other Disciplines.
Peterson, G.L., B.L. Driver, and R. Gregory (eds.). 1988. HD1386.5 A54 1988.

Economic Valuation of Wetland Functions and Values: Literature Review.
Luzar, E.J., and C. Gan. 1991. TA7 W343.W4.L8 1991.

The Economics of Natural Environments: Studies in the Valuation of Commodity and Amenity Resources.
Krutilla, J.V., and A.C. Fisher. 1985. 333.7 K94A.

Environmental Valuation: The Role of Stakeholder Communication and Collaborative Planning
Schkade, D.A., T.D. Feather, and D.T. Capan. 1996. U.S. Army Corps of Engineers,
Water Resources Support Center, Institute for Water Resources; U.S. Army Corps of
Engineers, Waterways Experiment Station. GB701 I5R NO.96-R-17.
<http://www.iwr.usace.army.mil/iwr/pdf/96r17.pdf>

Hydrogeomorphic (HGM) Approach to Assessing Wetland Functions.
<http://www.wes.army.mil/el/wetlands/hgmhp.html>

Literature Review of Economic Valuation of Aquatic Plant Control.
Thunberg, E.M. 1991. TA7 W34M NO.A-91-1.

Market Analysis for Valuation Appraisals.
Fanning, S.F., T.V. Grissom, and T.D. Pearson. 1994. 333.33 F33 1994.

*National Economic Development Procedures Manual—Recreation. Volume III, A Case Study
Application of the Contingent Valuation Method for Estimating Urban Recreation Use
and Benefits.*
Hansen, W.J. et al. 1990. GB701 I5R NO.90-R-11.

Nonmarket Valuation of Freshwater Wetlands: The Francis Beidler Forest.
Dillman, B.L., L.J. Beran, and D.D. Hook. 1993. GB705 C57R NO.135.

The Preservation and Valuation of Biological Resources.

Orians, G.H. et al. (eds.). 1990. 333.95 OR4.

Summary of Valuation Methods for Wetlands

Henderson, J.E. 1989. TA7 W344.E58 NO.EEDP-06-8.

Valuation of Lake Resources Through Hedonic Pricing.

Feather, T.D., in collaboration with E.M. Pettit and P. Ventikos. 1993. GB701 I5R NO.92-R-8.

6.2 Council on Environmental Quality

Choosing Appropriate Scales for Making Decisions on Cumulative Impacts: A Guide for Managers.

U.S. Conservation Foundation. 1990. Prepared for the Council on Environmental Quality. Washington, DC.

Considering Cumulative Effects Under the National Environmental Policy Act.

40 CFR Parts 1500-15081 [1978].

<http://clinton4.nara.gov/CEQ/reports/effects/ccenepa.html>

Inventory of U.S. Federal Agency Activities on Cumulative Impact Assessment.

Cohrssen, J.J. (ed.) 1988. Washington, DC: Council on Environmental Quality.

<http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>

6.3 Department of Agriculture (USDA)

6.3.1 Forest Service (USFS)

Assessing the Cumulative Effects of Linear Recreation Routes on Wildlife Habitats on the Okanogan and Wenatchee National Forests.

Gaines W.L., P.H. Singleton, and R.C. Ross. 2002. Draft General Technical Report PNW-GTR-XXX.

<http://www.fs.fed.us/r6/wenatchee/recreate/Rec-wildlife-effects-5-01-02.pdf>

Economics of Forest Protection and Management.

Southern Research Station.

Values of Forest Goods and Services (selection of papers)

<http://www.srs.fs.usda.gov/econ/research/pa98-4.htm>

Identification and Valuation of Wildland Resource Benefits Program.

Rocky Mountain Research Station.

<http://www.fs.fed.us/rm/value/>

6.3.2 Economic Research Service (ERS)

Agricultural Economics Report Series.

Agricultural Resources and Environmental Indicators, 2000.

<http://www.ers.usda.gov/Emphases/Harmony/issues/arei2000/>

Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP.

<http://www.ers.usda.gov/publications/aer778/>

Wetlands and Agriculture: Private Interests and Public Benefits.

<http://www.ers.usda.gov/publications/aer765/>

6.3.3 Natural Resources Conservation Service (NRCS)

Economic and Watershed Technical Information.

<http://waterhome.tamu.edu/NRCSdata/tech.html>

Resource Economics and Social Sciences Division.

<http://www.nrcs.usda.gov/technical/RESS/>

Natural Resource Economics Handbook.

<http://waterhome.tamu.edu/NRCSdata/tech.html>

6.4 Department of Commerce

6.4.1 National Oceanic and Atmospheric Administration (NOAA)

6.4.1.1 Center for Sponsored Coastal Ocean Research, Coastal Ocean Program, Decision Analysis Series.

Economic Valuation of Natural Resources: A Guidebook for Coastal Resources Policymakers.

<http://www.mdsg.umd.edu/Extension/valuation/handbook.htm>

6.4.1.2 Coastal and Ocean Resource Economics (CORE) Program.

<http://marineeconomics.noaa.gov/#Valuation>

6.4.1.3 Damage Assessment and Restoration Program (DARP).

<http://www.darp.noaa.gov/>

Damage Assessment and Restoration Plan and Environmental Assessment for the Point Comfort/La Vaca Bay NPL Site: Ecological Injuries and Service Losses.

<http://www.darp.noaa.gov/seregion/lvbpdf/lavdarpe.pdf>

Damage Assessment and Restoration Plan and Environmental Assessment for the Point Comfort/La Vaca Bay NPL Site: Recreational Fishing Losses.

<http://www.darp.noaa.gov/seregion/lvbpdf/lavdarpr.pdf>

Hudson River Natural Resource Damage Assessment Plan.

<http://www.darp.noaa.gov/neregion/hrpdf/hmrdafl.pdf>

6.4.1.4 *National Marine Fisheries Service (NMFS)*

Fisheries Economics.

http://www.nmfs.noaa.gov/fisheries_econ.htm

Guidelines for Economic Analysis of Fishery Management Actions.

<http://www.nmfs.noaa.gov/sfa/New%20RFA%20Guidelines%20Final%20%20Version%2010-03-00.htm>

Our Living Oceans: The Economic Valuation of U.S. Fisheries.

Office of Sustainable Fisheries. 1996. NOAA Technical Memorandum.

6.5 Department of Energy

Methodologies for Assessing the Cumulative Environmental Effects of Hydroelectric Development of Fish and Wildlife in the Columbia River Basin. Volume 2: Example and Procedural Guidelines.

U.S. Department of Energy and Bonneville Power Administration. 1987DOE/BP-19461-4.

<http://www.efw.bpa.gov/Environment/EW/EWP/DOCS/REPORTS/GENERAL/I19461-4.pdf>

6.6 Department of the Interior (DOI)

6.6.1 *National Park Service (NPS)*

Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors.

<http://www.nps.gov/pwro/rtca/econ9.pdf>

6.6.2 *Fish & Wildlife Service (FWS)*

Economic Analysis for Hydropower Relicensing: Guidance and Alternative Methods.

<http://policy.fws.gov/hydrotoc.pdf>

Chapter 5. Primary Methods and Key Concepts for Valuing Non-Power Benefits.

<http://policy.fws.gov/hydrochap5.pdf>

Habitat Evaluation Procedures (HEP).

FWS Division of Ecological Services.

<http://policy.fws.gov/ESMindex.html>

A Manual for Conducting Natural Resource Damage Assessment: The Role of Economics.
FWS Division of Economics. 1995.
<http://policy.fws.gov/NRDAIndex.html>

6.6.3 Bureau of Land Management (BLM)

Colorado Plateau Managers' Coalition: Social Valuation of Environmental and Community Amenities of the Colorado Plateau Program.
<http://www.co.blm.gov/coplat/cpresearch.htm>.

Notes on Ecological Valuation Across Cultural Boundaries.
Winthrop, R. February 2003. Prepared for Workshop on Valuing Ecological Benefits,
USEPA National Center for Environmental Economics, Washington, DC.

Snake River Resource Management Plan.
(Pinedale Field Office). 2003. Draft EIS (see Appendix 6).
<http://www.wy.blm.gov/srrmp/deis/>

6.6.4 United States Geological Survey (USGS)

Duck Populations as Indicators of Landscape Condition in the Prairie Pothole Region.
Austin, J.E., T.K. Buhl, G.R. Guntenspergen, W. Norling, and H.T. Sklebar. 2001.
Environmental Monitoring and Assessment 69:29-47. Jamestown, ND: Northern Prairie
Wildlife Research Center Home Page. (Version 05DEC2001).
<http://www.npwrc.usgs.gov/resource/2001/dpopland/dpopland.htm>

The Fort Collins Science Center.
http://www.mesc.usgs.gov/resources/fact_sheets/020730.pdf

Habitat Evaluation Procedures (HEP).
<http://www.mesc.usgs.gov/products/software/hep/hep.asp>

Major Issues and Finding: What Are the Cumulative Effects of Mixed (Urban/Agriculture) Land Use on Water Quality.
<http://water.usgs.gov/pubs/circ1167/nawqa91.c.html>

A Science Strategy for Ecosystem Health, Sustainability, and Land Surface Change Research.
Status and Trends of the Nation's Biological Resources. Internal draft.
<http://biology.usgs.gov/s+t/SNT/index.htm>

6.7 Department of Transportation

6.7.1 Federal Highway Administration

Secondary and Cumulative Impact Assessment in the Highway Project Development Process.

April 1992. Position Paper, Project Development Branch, HEP-32.

[http://nepa.fhwa.dot.gov/ReNepa/ReNepa.nsf/aa5aec9f63be385c852568cc0055ea16/845bc790d9a8949985256934006ae913/\\$FILE/Secondary+and+Cumulative+Impact+Assessment+in+the+Highway+Project+Development+Process.htm](http://nepa.fhwa.dot.gov/ReNepa/ReNepa.nsf/aa5aec9f63be385c852568cc0055ea16/845bc790d9a8949985256934006ae913/$FILE/Secondary+and+Cumulative+Impact+Assessment+in+the+Highway+Project+Development+Process.htm)

6.8 National Aeronautics and Space Administration.

Proposed Indices of Leading Climatic Indicators for Impact Assessment.

<http://www.earth.nasa.gov/visions/in-situ/chap4.htm>

7. FOREIGN GOVERNMENT SOURCES

This section includes a short list of potentially useful foreign government sources. Our search of these sources was relatively limited, but the following reports and websites were identified as being particularly relevant to this effort.

7.1 Canada

Agriculture and Agri-Food Canada (Environment Bureau).

Report on Agri-Environmental Indicators.

http://www.agr.gc.ca/policy/environment/eb/public_html/ebe/aei.html

Canadian Environmental Assessment Agency.

Reference Guide: Addressing Cumulative Environmental Effects.

http://www.ceaa-acee.gc.ca/0011/0001/0008/guide1_e.htm

Environment Canada.

Cumulative Impacts on Aquatic Biodiversity Project.

<http://www.nwri.ca/aeirb/ciabp.html>

7.2 The Netherlands

Workshop on the Valuation of Ecosystem Benefits from Air Pollution Abatement.

The Netherlands Ministry of Housing, Spatial Planning and the Environment.

October 2002 Put on by UNECE/Network of Experts on Benefits and Economic Instruments (NEBEI). Presenters from EPA, the Netherlands, the UK, and Norway.

<http://www2.minvrom.nl/pagina.html?id=5181>

7.3 New Zealand

New Zealand Ministry for the Environment.

Environmental Performance Indicators Programme.

<http://www.environment.govt.nz/indicators/>

8. NONGOVERNMENTAL, ACADEMIC, AND INTERNATIONAL INSTITUTIONS

The following is a list of other nongovernment sources, including reports and descriptions of relevant research by nongovernmental, academic, and international organizations. They are organized alphabetically by the name of the organization.

8.1 The Beijer International Institute of Ecological Economics (The Royal Swedish Academy of Sciences)

Swedish Component of ECOWET Project.

<http://www.beijer.kva.se/research/research.html>

8.2 Canaan Valley Institute

Mid-Atlantic Highlands Action Program. Transforming the Legacy. July 2002.

<http://www.canaanvi.org/hapreport>

8.3 Centre for Social and Economic Research on the Global Environment (CSERGE), University of East Anglia, UK.

Environmental Valuation Research Site.

http://www.uea.ac.uk/env/cserge/research/env_val.htm

8.4 Ecological Society of America

Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management (see also cited article from *Ecological Applications*).

<http://www.sdsc.edu/%7EEESA/ecmtext.htm>

8.5 Gund Institute of Ecological Economics, University of Vermont (formerly located at the University of Maryland)

<http://www.uvm.edu/giee/>

The Geography of Ecosystem Services: Maximizing the Value of Landscapes in Land-use Conservation (abstract of presentation at the Society for Conservation Biology's 2002 Annual Meeting, available at

<http://www.conservationbiology.org/SCB/Activities/Meetings/2002/abstracts/symposia/sympeight.cfm>)

8.6 The H. John Heinz III Center for Science, Economics and the Environment

State of the Nation's Ecosystems. 2002. Cambridge, UK: Cambridge University Press.
<http://www.heinzctr.org/ecosystems/>

8.7 Institute of Ecosystem Studies

The Baltimore Ecosystem Study.
http://www.ecostudies.org/bes/frame4-page_3d.html

8.8 International Council for the Exploration of the Sea

Report of the Study Group on Ecosystem Assessment and Monitoring.
<http://www.ices.dk/reports/mhc/2000/sgeam00.doc>

8.9 International Society for Ecological Economics

<http://www.ecologicaleconomics.org/research/research.htm>

8.10 International Society for Ecosystem Health

Rapport, D.J., G. Bohm, D. Buckingham, J. Cairns, Jr., R. Costanza, J.R. Karr, H.A.M. de Kruijf, R. Levins, A.J. McMichael, N.O. Nielsen, and W.G. Whitford. 1999. "Ecosystem Health: The Concept, the ISEH, and the Important Tasks Ahead." *Ecosystem Health* 5(2):82-90.
<http://www.ecosystemhealth.com/images/ISEHCommentary.pdf>

8.11 National Research Council (NRC), National Academy of Science (NAS)

Assessing and Valuing the Services of Aquatic Ecosystems. Water Science and Technology Board. Project WSTB-U-00-02-A.
<http://www4.nas.edu/webcr.nsf/ProjectScopeDisplay/WSTB-U-00-02-A>

Cumulative Environmental Effects of Alaskan North Slope Oil and Gas Activities. Report not yet released, project description available online at
<http://www4.nas.edu/cp.nsf/852563d50053f0c285255d8b004e349a/bfa0b288f956c05285256922005abf61>

Ecological Indicators for the Nation. 2000. Committee to Evaluate Indicators for Monitoring Aquatic and Terrestrial Environments, National Research Council.
<http://www.nap.edu/books/0309068452/html/>

Ecological Knowledge and Environmental Problem Solving—Concepts and Case Studies. National Research Council. 1986. Committee on the Applications of Ecological Theory to Environmental Problems. Washington, DC: National Academy Press.
<http://books.nap.edu/books/0309036453/html/93.html#pagetop>

New Directions in Water Resources Planning for the U.S. Army Corps of Engineers. Committee to Assess the U.S. Army Corps of Engineers Water Resources Project Planning Procedures, National Research Council. 1999.

8.12 Northeast-Midwest Institute

Economic Valuation of Great Lakes Environmental Benefits
<http://www.nemw.org/greatlakes.htm#econval>

8.13 Organization for Economic Cooperation. 2002.

OECD Environmental Indicators: Towards Sustainable Development, 2001.

8.14 Pacific Research Institute

Index of Leading Environmental Indicators, 7th Edition.
Hayward, S.F., and J. Majeres. 2002. San Francisco, CA: Pacific Research Institute.
http://www.pacificresearch.org/pub/sab/enviro/ei2002-states/pri_enviro_index_2002.pdf

8.15 United Nations (UN)

UN Department of Economic and Social Affairs.

List of environmental and related socio-economic indicators.
<http://unstats.un.org/unsd/environment/indicators.htm>

UN Environmental Program (UNEP).

The Global Biodiversity Assessment.
<http://www.unep.org/unep/gef/BioGba.htm>

UNESCO Intergovernmental Oceanographic Commission (IOC).

Large Marine Ecosystem Valuation
<http://ioc.unesco.org/iocweb/iocpub/iocdoc/ggelme03.doc>

8.16 Woods Hole Oceanographic Institution

Marine Policy Center Research Projects.

<http://www.whoi.edu/science/MPC/dept/research/index.html>

8.17 World Bank

Environmental Valuation.

<http://lnweb18.worldbank.org/ESSD/essdext.nsf/44ByDocName/EnvironmentalEconomicsandItsApplicationsEnvironmentalValuation>

8.18 World Commission on Dams

Dams, Ecosystem Functions and Environmental Restoration.

http://www.damsreport.org/docs/kbase/thematic/drafts/tr21_draft.pdf

8.19 World Resources Institute

Indicators of Potential Risks to Human Health from Environmental Threats.

<http://www.wri.org/wri/ehi/index.html>